

REMARKS

The present application was filed on September 5, 2003 with claims 1-32.

In the outstanding final Office Action, the Examiner: (i) maintains the rejection of claims 16 and 32 under 35 U.S.C. §101 alleging that the claimed invention is directed to non-statutory subject matter; (ii) maintains the rejection of claims 16 and 32 under 35 U.S.C. §112, first paragraph; and (iii) maintains the rejection of claims 1-5, 11-15, 17-21 and 27-31 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 7,023,806 to Gunluk (hereinafter “Gunluk”) in view of U.S. Patent No. 7,058,012 to Chen et al. (hereinafter “Chen”).

The present final Office Action states that claims 6-10 and 22-26 are allowable. However, Applicants respectfully point out that said claims should more properly be indicated as being allowed since, in the previous response, Applicants placed claim 6 and claim 22 into independent form, with claims 7-10 and 23-26 respectively depending from now independent claims 6 and 22.

Furthermore, in this response, Applicants traverse the §101, §112, and §103(a) rejections and respectfully request reconsideration of the application in view of the remarks below.

Regarding the §101 rejection of claims 16 and 32, Applicants respectfully submit that “designing a K-shared network based on a set of one or more demands,” as recited in the preamble of independent claims 16 and 32, is precisely the sort of “practical application” producing a “useful, concrete and tangible result” deemed patentable by the Federal Circuit. See, e.g., AT&T Corp. v. Excel Communications Inc., 172 F.3d 1352, 1359, 50 USPQ2d 1447, 1452 (Fed. Cir. 1999) citing Arrhythmia Research Technology Inc. v. Corazonix Corp., 958 F.2d 1053, 1060, 22 USPQ2d 1033, 1039 (Fed. Cir. 1992) (finding “method claims satisfied §101 because the mathematical algorithm included within the process was applied to produce a number which had specific meaning--a useful, concrete, tangible result--not a mathematical abstraction.”); State Street Bank & Trust Co. v. Signature Financial Group, 149 F.3d 1368, 1373, 47 USPQ2d 1596, 1601 (Fed. Cir. 1998) citing Arrhythmia (upholding the patentable nature of “transformation of . . . signals . . . by a machine through a series of mathematical calculations constituted a practical application of an abstract idea (a mathematical algorithm, formula, or calculation), because it corresponded to a useful, concrete or tangible thing.”)

For the sake of clarification, Applicants point out that the computed candidate primary paths and candidate secondary paths based on the set of one or more demands are manipulated based on the integer linear program formulation applied to the computed candidate primary paths and candidate secondary paths, and solving the integer linear program formulation so as to generate a K-shared network design – thus producing a “useful, concrete and tangible result.”

The rationale in the final Office Action at page 4, in fact, supports the argument that said claims are statutory under §101. On page 4, the final Office Action admits that the subject matter in question includes “both tangible embodiments and intangible embodiments.” Thus, by this admission alone, claims 16 and 22 are statutory under §101. The final Office Action later (at page 5) states that “[a] process that consists solely of the manipulation of an abstract idea is not concrete or tangible” (underlining added by Applicants for emphasis). By the admission in the Office Action, claims 16 and 22 are not solely based on intangible embodiments, but rather also contain tangible embodiments, thus making the claims statutory under §101.

The final Office Action extensively cites In re Warmerdam, 33 F.3d 1354 (Fed. Cir. 1994). However, in the method claim at issue in Warmerdam, the recited steps involving locating a medial axis of an object and creating a bubble hierarchy on the medial axis were found to involve “the solving of a mathematical algorithm” and to be “essentially mathematical in nature.” See Warmerdam, at 1359-1360. The Federal Circuit further found that “the only practical . . . embodiment” involved utilization of a particular mathematical algorithm to locate the medial axis, followed by use of another mathematical algorithm to create the bubble hierarchy. See Warmerdam, at 1360. Accordingly, that method claim was found to recite nothing more than abstract ideas in the form of mathematical algorithms.

Claims 16 and 32, as indicated above, recite computing candidate primary paths and candidate secondary paths based on a set of one or more demands . . . and solving an integer linear program formulation applied to the paths so as to generate a K-shared network design. Thus, while part of the claims includes solving an integer linear program formulation, the claims do not solely recite such a limitation and therefore are clearly not limited to a mathematical algorithm.

It is also important to view claims 16 and 32 in the light of State Street Bank & Trust Co. v. Signature Financial Group, Inc., 149 F.3d 1368 (Fed. Cir. 1998). In this case, the Federal Circuit noted that the question of whether a claim encompasses statutory subject matter should focus on “the essential characteristics of the subject matter, in particular, its practical utility.” See State Street, at 1375. The Federal Circuit further indicated that “the mere fact that a claimed invention involves inputting numbers, calculating numbers, outputting numbers, and storing numbers, in and of itself, would not render it non-statutory subject matter, unless . . . its operation does not produce a ‘useful, concrete and tangible result.’” See State Street, at 1374, citing In re Allapat, 33 F.3d 1526, 1544.

As mentioned previously, the claims generate a K-shared network based on a set of one or more demands. Thus, the claims express a useful, concrete and tangible result (K-shared network design) in the field of network design based on demands.

Accordingly, the claims therefore meet the requirements set forth in State Street, and do not preempt use of any particular mathematical algorithm(s) of the type at issue in Warmerdam.

Accordingly, the §101 rejection of claims 16 and 32 should be withdrawn.

With regard to the §112, first paragraph rejection of claims 16 and 32, Applicants respectfully disagree with the allegation that the claimed invention is not supported by either a specific asserted utility or a well established utility. The above-noted arguments with regard to claims 16 and 32 clearly delineate producing a useful, concrete and tangible result. Accordingly, the §112, first paragraph rejection of claims 16 and 32 should be withdrawn.

Independent claim 1 is directed to a method of determining a route for a demand in a network, wherein the network comprises primary paths and secondary paths, and at least two secondary paths may share a given link, the method comprising the steps of: transforming a graph representing the network, wherein edges of the graph represent channels associated with paths and nodes of the graph represent nodes of the network, the transformation being performed such that costs associated with the edges reflect costs of using channels in secondary paths; and finding the shortest path between nodes corresponding to the demand in the transformed graph, the shortest path representing the least-cost path in the network over which the demand may be routed.

With regard to the §103(a) rejections, Applicants initially note that a proper case of obviousness requires that the cited references when combined must “teach or suggest all the claim limitations,” and that there be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references or to modify the reference teachings. See Manual of Patent Examining Procedure (MPEP), Eighth Edition, August 2001, §706.02(j).

Applicants submit that the Examiner has failed to establish a proper case of obviousness in the §103(a) rejection of claims 1-5, 11-15, 17-21 and 31 over Gunluk and Chen, in that the Gunluk and Chen references, even if assumed to be combinable, fail to teach or suggest all the claim limitations, and in that no cogent motivation has been identified for combining the references or modifying the reference teachings to reach the claimed invention.

The Examiner in formulating the §103(a) rejection of claim 1 argues that each and every one of the above-noted limitations is met by the collective teachings of Gunluk and Chen. Below, Applicants explain how such portions of Gunluk and Chen fail to teach or suggest what the Examiner contends that they teach or suggest. While Applicants may refer from time to time to each reference alone in describing its deficiencies, it is to be understood that such arguments are intended to point out the overall deficiency of the cited combination.

In characterizing the Gunluk reference as teaching or suggesting the step of transforming a graph representing the network, wherein edges of the graph represent channels associated with paths and nodes of the graph represent nodes of the network, the transformation being performed such that costs associated with the edges reflect costs of using channels in secondary paths, the Examiner refers to Gunluk at FIG. 2 and column 8, lines 34 through column 9, line 7.

FIG. 2 of Gunluk is a flow chart of a method 200 for routing demands. Demands T are individually routed, such that if a demand  $T_j$  has already been routed on route  $R_j$  and is required to be diverse from  $T_i$ , demand  $T_i$  is then routed on route  $R_i$  using a shortest path algorithm. Assuming that the constructed representation of the network teaches or suggests the recited graph representing the network of claim 1, Gunluk does not disclose transforming the constructed representation of the network such that costs associated with the edges of the representation reflect costs of using

channels in secondary paths. Both  $R_j$  and  $R_i$  may be shortest path algorithms corresponding to demand  $T_j$  and  $T_i$  respectively, however,  $R_j$  and  $R_i$  are primary paths, not secondary paths of a transformed constructed representation. No where does Gunluk teach or suggest transforming a graph representing the network, wherein edges of the graph represent channels associated with paths and nodes of the graph represent nodes of the network, the transformation being performed such that costs associated with the edges reflect costs of using channels in secondary paths.

The Chen reference fails to supplement the above-noted deficiencies of Gunluk as applied to claim 1. Accordingly, it is believed that the combined teachings of Gunluk and Chen fail to meet the limitations of claim 1.

Independent claim 17 includes limitations similar to those of claim 1, and is therefore believed allowable for reasons similar to those described above with reference to claim 1.

Regarding claims 2-5, 15, 18-21 and 31, Applicants assert that such claims are patentable not only due to their respective dependence on claims 1 and 17, but also because such claims recite patentable subject matter in their own right.

Independent claim 16 is directed to a method of designing a K-shared network based on a set of one or more demands, comprising the steps of: computing candidate primary paths and candidate secondary paths based on the set of one or more demands, wherein at least two candidate secondary paths may share a given channel and the number of shared channels incident on another channel is a finite number K; applying an integer linear program formulation to the computed candidate primary paths and candidate secondary paths; and solving the integer linear program formulation applied to the computed candidate primary paths and candidate secondary paths so as to generate a K-shared network design.

As noted above with regard to claim 1, neither Gunluk nor Chen teaches or suggests candidate primary paths and candidate secondary paths based on the set of one or more demands. Accordingly, it is believed that the combined teachings of Gunluk and Chen fail to meet the limitations of claim 16.

Independent claim 32 includes limitations similar to those of claim 16, and is therefore believed allowable for reasons similar to those described above with reference to claim 16.

Regarding claims 12-14 and 27-30, Applicants assert that such claims are patentable not only due to their respective dependence on claim 16, but also because such claims recite patentable subject matter in their own right.

Also, the Examiner has failed to identify a cogent motivation for combining Gunluk and Chen in the manner proposed. The Examiner provides the following statement of motivation beginning at page 7, last paragraph of the Office Action:

One skilled in the art of communications would recognize the need for determining a route for a demand in a network routing, and would apply Chen's novel use of the automatic end to end paths for SONET networks into Gunluk's method of routing signals over an optical network while satisfying diversity requirements and other network constraints. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Chen's systems and methods for automatic end to end path provisioning for SONET networks into Gunluk's method for routing optical signals with diversity requirements with the motivation being to provide a system and method for routing and design in K-shared network.

Applicants respectfully submit that this is a conclusory statement of the sort rejected by both the Federal Circuit and the U.S. Supreme Court. See KSR v. Teleflex, No. 13-1450, slip. op. at 14 (U.S., Apr. 30, 2007), quoting In re Kahn, 441 F. 3d 977, 988 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."). There has been no showing in the present §103(a) rejection of claims 1-5, 11-21 and 27-32 of objective evidence of record that would motivate one skilled in the art to combine Gunluk and Chen to produce the particular limitations in question. The above-quoted statement of motivation provided by the Examiner appears to be a conclusory statement of the type ruled insufficient in KSR v. Teleflex.

In the final Office Action, while the Examiner appears to attempt to address the lack of motivation to combine issue, the final Office Action fails to address the deficiencies pointed out with respect to the application of Gunluk in combination with Chen, namely, the fact that Gunluk (and thus the combination of Gunluk and Chen) fails to disclose transforming a graph representing the

network, wherein edges of the graph represent channels associated with paths and nodes of the graph represent nodes of the network, the transformation being performed such that costs associated with the edges reflect costs of using channels in secondary paths.

In view of the above, Applicants believe that claims 1-32 are in condition for allowance, and respectfully request withdrawal of the §101, §112 and §103(a) rejections.

Respectfully submitted,



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Date: March 7, 2008